

first input signal and generates a first differential output signal, and a first grounded base amplifier that receives the first input signal and generates a second differential output signal. A second differential converter includes a second grounded emitter amplifier that receives the second input signal and generates a third differential output signal, and a second grounded base amplifier that receives the second input signal and generates a fourth differential output signal. The first output signal is generated by coupling the first differential output signal and the fourth differential output signal. The second output signal is generated by coupling the second differential output signal and the third differential output signal.

The essence of the claimed invention as recited in claim 1, is a differential amplifier that includes two grounded emitter amplifiers cross coupled to two grounded emitter amplifiers. The ground emitter amplifiers operate to reverse the phase manner to the ground base amplifiers. As a result, the balance and the linearity of the differential output signals is improved. Accordingly, Applicant respectfully submits that the applied prior art fails to teach or suggest the all the features of the claimed invention, and therefore fails to provide the non-obvious advantages of the present invention.

Quinn is directed to a high-precision amplifier that employs a feed-forward technique to provide a first order correction of amplifier distortion. The differential amplifier comprises a first emitter-coupled pair of transistors which receive a differential signal at the bases. The respective bases of a second emitter-coupled pair of correction amplifier transistors are coupled to the emitters of the first pair of transistors. Figure 4 of Quinn discloses a correction amplifier transistors 100, 102 connected to the collector circuit of main amplifier transistors 70, 72.

It is respectfully submitted that Quinn neither teaches nor suggests the features recited in claim 1. In particular, the transistors 100, 102 indicated by the Office Action are different than the ground emitter amplifiers of the claimed invention. Transistors 100, 102 are used as differential emitter-coupled amplifiers for sensing the base-to-emitter distortions of the grounded base amplifiers 78, 80. Also, transistors 100, 102 are used for canceling the distortions by adding error outputs to the outputs of the grounded base

amplifiers 78, 80. Therefore, the input signals are not provided to the transistors 100, 102.

In contrast, the input signals are provided to the grounded emitter amplifiers of the claimed invention. Additionally, Quinn discloses a differential amplifier having two emitter-coupled amplifiers 70,72, and two grounded base amplifiers 78, 80. However, the emitter-coupled amplifiers 70,72, are not cross-connected to the grounded base amplifier 78,80. Accordingly, Applicants submit that Quinn neither teaches nor suggests all the features recited in claim 1. As a result, Applicants request the withdrawal of the rejection of claim 1.

Claim 2 is dependent upon claim 1, therefore for at least the reasons mentioned above, claim 2 also recites subject matter that is neither taught nor suggested by Quinn. Thus, Applicants request the withdrawal of the rejection of claim 2.

Claim 7 is rejected under 35 U.S.C. 103 (a) as being unpatentable over the Admitted Prior Art (Gilbert-cell mixer) in view of Quinn Re. 31, 545). The Office Action takes the position that the combination of the Gilbert-cell mixer and Quinn neither teaches nor suggests all the features recited in claim 7. Applicant respectfully requests reconsideration in view of the following remarks.

Claim 7 is directed to a mixer that mixes a first and second input signals with first and second carrier signals to generate first and second mixer output signals. The mixer comprises a differential amplifier that receives the first and second input signals and generates first and second output signals. The differential amplifier includes a first differential converter including a first grounded emitter amplifier that receives the first input signal and generates a first differential output signal and a first grounded base amplifier that receives the first input signal and generates a second differential output signal. A second differential converter including a second grounded emitter amplifier that receives the second input signal and generates a third differential output signal, and a second grounded base amplifier that receives the second input signal and generates a fourth differential output signal. The first output signal is generated by coupling the first differential output signal and the fourth differential output signal. The second output signal is generated by coupling the second differential output signal and the third differential output signal. A pair of differential circuits are connected to the differential amplifier, for

receiving the first and second output signals and the first and second carrier signals to generate the first and second mixer output signals.

It is respectfully submitted that the combination of the Admitted Prior Art and Quinn neither teaches nor suggests the features recited in claim 7. Although the Admitted Prior Art teaches a mixer as in the present invention, the Admitted Prior Art does not disclose a differential amplifier as recited in claim 7. Furthermore, Quinn does not teach the features of the different amplifier as recited in claim 7. Specifically, the applied prior art neither teaches nor suggests a first and second grounded emitter amplifiers that receive a first and second input signal.

As discussed above, the transistors 100,102 as disclosed in Quinn are not the same as the grounded emitter amplifiers of the claimed invention. The transistors in Quinn are used as differential emitter-coupled amplifiers for sensing the base-to-emitter distortions of the grounded base amplifiers and for canceling the distortions by adding error outputs to the outputs of the grounded base amplifiers. Accordingly, input signals are not inputted into the transistors 100, 102. However, as recited in claim 7, a first and second input signals are received by a first and second grounded emitter amplifier. Therefore, Applicants submit that the applied prior art neither teaches nor suggests all the features recited in claim 7. Accordingly, Applicants request the withdrawal of the rejection of claim 7.

Claims 3-5 are objected to as being dependent upon a rejected base claim. The rewriting of claims 3-5 in independent form is being held in abeyance until the final disposition of rejected claims 1 and 2.

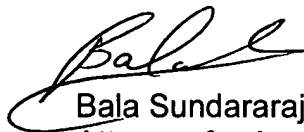
Therefore, in view of the distinctions discussed above, consideration and allowance of claims 1, 2, and 7 is respectfully requested. Applicants respectfully submit that claims 1, 2, and 7 contain subject matter that is neither taught nor suggested by the applied prior art. Therefore, Applicant submits that the application is now in condition for allowance with claims 1-8 contained therein.

Should the Examiner believe the application is not in condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

In the event this paper is not considered to be timely filed, Applicant respectfully petitions for an appropriate extension of time. The Commissioner is authorized to charge payment for any additional fees which may be required with respect to this paper to Counsel's Deposit Account 01-2300.

Respectfully submitted,

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